



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/990,844	11/21/2001	Thomas Klingenbrunn	01P15526US	2700

7590 12/20/2006
Siemens Corporation
Attn: Elsa Keller, Legal Administrator
Intellectual Property Department
186 Wood Avenue South
Iselin, NJ 08830

EXAMINER

WARE, CICELY Q.

ART UNIT	PAPER NUMBER
----------	--------------

2611

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	12/20/2006	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

09/990,844

Applicant(s)

KLINGENBRUNN ET AL.

Examiner

Cicely Ware

Art Unit

2611

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 September 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 9/26/2006 have been fully considered but they are not persuasive.

a. On pgs. 2-3 of applicant's REMARKS, applicant asserts that Bar-David et al. does not disclose "generating said reduced trellis by calculating only path metrics for states in which the previous symbol has the determined value".

Examiner disagrees. Examiner asserts that Bar-David et al. discloses in Fig. 14, wherein a mode sifter evaluates each retained state for a particular symbol and select the state (path metric) from the previous symbol having the greatest path weight, which indicates the most likely path through the trellis. The mode sifter determines the predefined window period for the symbol length and makes a determination about the previous symbol after symbol (k+1) has been processed (col. 23, lines 32-67 – col. 24, lines 1-3).

Therefore the original rejection stands.

Claim Rejections - 35 USC § 101

2. Claims 1-21 are rejected under 35 U.S.C. 101 because:

a. The claimed invention is directed to non-statutory subject matter. For eligibility analysis, physical transformation "is not an invariable requirement, but merely one example of how a mathematical algorithm [or law of nature] may bring about a useful application." AT&T, 172 F.3d at 1358-59, 50 USPQ2d at 1452. If the examiner determines that the claim does not entail the transformation of an article, then the examiner shall review the claim to determine if the claim provides a practical application that produces a useful, tangible and concrete result.

In determining whether the claim is for a "practical application," the focus

Art Unit: 2611

is not on whether the steps taken to achieve a particular result are useful, tangible and concrete, but rather that the final result achieved by the claimed invention is "useful, tangible and concrete." The claim must be examined to see if it includes anything more than a Sec. 101 judicial exception. If the claim is directed to a practical application of the Sec. 101 judicial exception producing a result tied to the physical world that does not preempt the judicial exception, then the claim meets the statutory requirement of 35 U.S.C. Sec. 101. If the examiner does not find such a practical application, the examiner has determined that the claim is nonstatutory.

(2) "TANGIBLE RESULT"

The tangible requirement does not necessarily mean that a claim must either be tied to a particular machine or apparatus or must operate to change articles or materials to a different state or thing. However, the tangible requirement does require that the claim must recite more than a Sec. 101 judicial exception, in that the process claim must set forth a practical application of that Sec. 101 judicial exception to produce a real-world result. *Benson*, 409 U.S. at 71-72, 175 USPQ at 676-77 (invention ineligible because had "no substantial practical application."). "[A]n application of a law of nature or mathematical formula to a . . . process may well be deserving of patent protection." *Diehr*, 450 U.S. at 187, 209 USPQ at 8 (emphasis added); see also *Corning*, 56 U.S. (15 How.) at 268, 14 L.Ed. 683 ("It is for the discovery or invention of some practical method or means of producing a beneficial result or effect, that a patent is granted . . ."). In other words, the opposite meaning of "tangible" is "abstract."

(3) "CONCRETE RESULT"

Another consideration is whether the invention produces a "concrete" result. Usually, this question arises when a result cannot be assured. In other words, the process must have a result that can be substantially repeatable or the process must substantially produce the same result again. *In re Swartz*, 232 F.3d 862, 864, 56 USPQ2d 1703, 1704 (Fed. Cir. 2000) (where asserted result produced by the claimed invention is "irreproducible" claim should be rejected under section 101). The opposite of "concrete" is unrepeatable or unpredictable. Resolving this question is dependent on the level of skill in the art. For example, if the claimed invention is for a process which requires a particular skill, to determine whether that process is substantially repeatable will necessarily require a determination of the level of skill of the ordinary artisan in that field. An appropriate rejection under 35 U.S.C. Sec. 101 should be

accompanied by a lack of enablement rejection under 35 U.S.C. Sec. 112, paragraph 1, where the invention cannot operate as intended without undue experimentation. See *infra*.

Claim Objections

3. Claims 13 and 19 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claims 13 and 19 are directed to an arrangement that includes "a tap-selectable Viterbi equalizer", which is the element of independent claim 11. Claims 13 and 19 should not house the "tap-selectable Viterbi equalizer" of the independent claim, they should recite a further limitation of the "tap-selectable Viterbi equalizer".
4. With regard to claim 19, examiner asserts that claim 19 should depend on claim 11 due to the fact that claim 11 claims the tap-selectable Viterbi equalizer elements.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

6. Claim 5 is rejected under 35 U.S.C. 102(a) as being anticipated by Bar-David et al. (US Patent 5,623,511).

(1) With regard to claim 5, Bar-David et al. discloses in Fig. 14 a method of determining a reduced trellis from a sequence of symbols in a Viterbi detector comprising the steps of: determining the value (best path metric) of a previous symbol from the sequence of symbols; and generating said reduced trellis by calculating only path metrics (best path metric) for states in which the previous symbol has the determined value (col. 23, lines 32-67 – col. 24, lines 1-3).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 6, 7, 11, 12 are rejected under 35 U.S.C. 102(a) as being anticipated by Bar-David et al. (US Patent 5,623,511) as applied to claim 5, in view of Traeber (PCT WO01/11842) (columns and figures listed below are provided by the US translation of Traeber (US Patent 6,813,744)).

(1) With regard to claim 6, claim 6 inherits all the limitations of claim 5. However Bar-David et al. does not disclose wherein the step of determining comprises the steps of: determining at least one symbol from a previous determination including a plurality of current states; determining destination states for the determined symbol and determining a surviving path metric by comparing path metrics originating from the

states of the determined symbol; and determining the value of a previous symbol with respect to the determined symbol of the surviving state.

However Traeber discloses wherein the step of determining comprises the steps of: determining at least one symbol from a previous determination including a plurality of current states (Fig. 4, col. 1, lines 36-50, 31-34); determining destination states for the determined symbol and determining a surviving path metric by comparing path metrics originating from the states of the determined symbol (Fig. 5, col. 2, lines 39-52, 62-67- col. 3, lines 1-10); and determining the value of a previous symbol with respect to the determined symbol of the surviving state (Fig. 5, Fig. 7, col. 3, lines 19-30).

Therefore it would have been obvious to one of ordinary skill in the art to modify Bar-David et al. to incorporate the step of determining comprises the steps of: determining at least one symbol from a previous determination including a plurality of current states; determining destination states for the determined symbol and determining a surviving path metric by comparing path metrics originating from the states of the determined symbol; and determining the value of a previous symbol with respect to the determined symbol of the surviving state a Viterbi decoder with less complex circuitry and occupying less surface area (Traeber, col. 4, lines 22-25).

(2) With regard to claim 7, claim 7 inherits all the limitations of claim 6. Traeber discloses in (Fig. 4) wherein the previous symbol is the oldest symbol (t) (col. 2, lines 62-67 – col. 3, lines 1-10).

(3) With regard to claim 11, see rejection of claims 5 and 6.

(4) With regard to claim 12, claim 12 inherits all the limitations of claim 11.

Traeber further discloses in (Fig. 5 and 7 (ACS)) means for determining and said calculation means are implemented by a digital signal processor (col. 4, lines 40-60).

9. Claims 13, 14, 16-18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bar-David et al. (US Patent 5,623,511) as applied to claim 11, in further view of Sexton et al. (US Patent Application 2003/0048838) in further view of Malkov et al. (US Patent Application 2003/0053535), as applied to claims 13 and 19.

(1) With regard to claim 13, claim 13 inherits all the limitations of claim 11.

However Bar-David et al. does not disclose an arrangement for determining a trellis from a sequence of symbols comprising: a plurality of equalizers receiving said sequence of symbols each generating a trellis; a select unit for activating one of the equalizers, and a control unit receiving said sequence of symbols and for determining a power distribution of said sequence of symbols and controlling said select unit depending on said power distribution.

However Sexton et al. discloses in (Fig. 3) an arrangement for determining a trellis from a sequence of symbols comprising: a plurality of equalizers receiving (334, 332) said sequence of symbols (320) each generating a trellis (Pg. 5, col. 2, lines 9-14); a select unit for activating one of the equalizers (331); a control unit (320) receiving said sequence of symbols and for determining a power distribution of said sequence of symbols and controlling said select unit depending on said power distribution (Fig. 5)

(Pg. 3, col. 1, lines 57-64, col. 2, lines 33-40, 47-65, Pg. 4, col. 1, lines 7-30, 36-41, Pg. 5, col. 1, lines 19-25, col. 2, lines 1-14).

Therefore it would have been obvious to one of ordinary skill in the art to modify Bar-David et al. in view of Sexton et al. to incorporate an arrangement for determining a trellis from a sequence of symbols comprising: a plurality of equalizers receiving said sequence of symbols each generating a trellis; a select unit for activating one of the equalizers, and a control unit receiving said sequence of symbols and for determining a power distribution of said sequence of symbols and controlling said select unit depending on said power distribution in order to for better performance in weak channel coding schemes and mitigate ISI.

However Bar-David et al. in combination with Sexton et al. do not explicitly disclose each equalizer generating a trellis.

However Malkov et al. discloses each equalizer generating a trellis and wherein said equalizers include a tap-selectable Viterbi equalizer. Malkov et al. discloses that DFE uses trellis diagrams and MLSE uses a reduced-state maximum likelihood trellis and DDFSE employs a non-zero delay reduced state trellis calculation (Pg. 1, col. 1, lines 48-59, 66-67- col. 2, lines 1-12, 21-53).

Therefore it would have been obvious to one of ordinary skill in the art to modify Bar-David et al. in combination with Sexton et al. in view of Malkov et al. to incorporate each equalizer generating a trellis for better performance in weak channel coding schemes and mitigate ISI (Malkov et al., Pg. 1, col. 1, lines 33-43).

(3) With regard to claim 14, claim 14 inherits all the limitations of claim 13.

Malkov et al. further discloses Viterbi equalizer receiving said sequence of symbols generating a first trellis; a tap-selectable Viterbi equalizer receiving said sequence of symbols generating a second trellis and a delayed decision feedback sequence estimator receiving said sequence of symbols generating a first trellis. Examiner asserts that the Viterbi equalizer is used for MLSE detection (Pg. 1, col. 1, lines 27-35, 37-39, 42-43, 47-58).

(4) With regard to claims 16, claim 16 inherits all the limitations of claim 13. See rejection of claim 14.

(5) With regard to claim 17, claim 17 inherits all the limitations of claim 13. See rejection of claim 14.

(6) With regard to claim 18, claim 18 inherits all the limitations of claim 13. See rejection of claim 14.

(7) With regard to claim 19, claim 19 inherits all the limitations of claim 13. See rejection of claim 13.

10. Claims 20 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bar-David et al. (US Patent 5,623,511) in view of Sexton et al. (US Patent Application 2003/0048838) in view of Malkov et al. (US Patent Application 2003/0053535), as applied to claim 19, in view of Pirainen (US Patent Application 2003/0058974).

(1) With regard to claim 20, claim 20 inherits all the limitations of claim 19.

However Bar-David et al. in combination with Sexton et al. in combination with Malkov et al. do not disclose a control unit determines which one of said plurality of equalizers will receive said sequence of symbols and generate a trellis to output.

However Pirainen discloses a control unit determines which one of said plurality of equalizers will receive said sequence of symbols and generate a trellis to output (Pg. 4, col. 1, lines 4-9, col. 2, lines 8-13, 39-44).

Therefore it would have been obvious to one of ordinary skill in the art to modify Bar-David et al. in combination with Sexton et al. in combination with Malkov et al. in view of Pirainen to incorporate a control unit determines which one of said plurality of equalizers will receive said sequence of symbols and generate a trellis to output in order to maintain the best possible quality of the signal irrespective of channel quality and coding scheme used for error correction and detection (Pirainen, Pg. 1, col. 2, lines 25-29)

(2) With regard to claim 21, claim 21 inherits all the limitations of claim 19.

Pirainen further discloses a control unit determines which one of the trellis generated by said plurality of equalizers receiving said sequence of symbols is output (Pg. 4, col. 1, lines 4-9, col. 2, lines 8-13, 39-44).

Conclusion

Art Unit: 2611


11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cicely Ware whose telephone number is 571-272-3047. The examiner can normally be reached on Monday – Friday, 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammed Ghayour can be reached on 571-272-3021. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9314 for regular communications and 703-872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-3900.

Cicely Ware

cqw
December 11, 2006


MOHAMMED GHAYOUR
SUPERVISORY PATENT EXAMINER